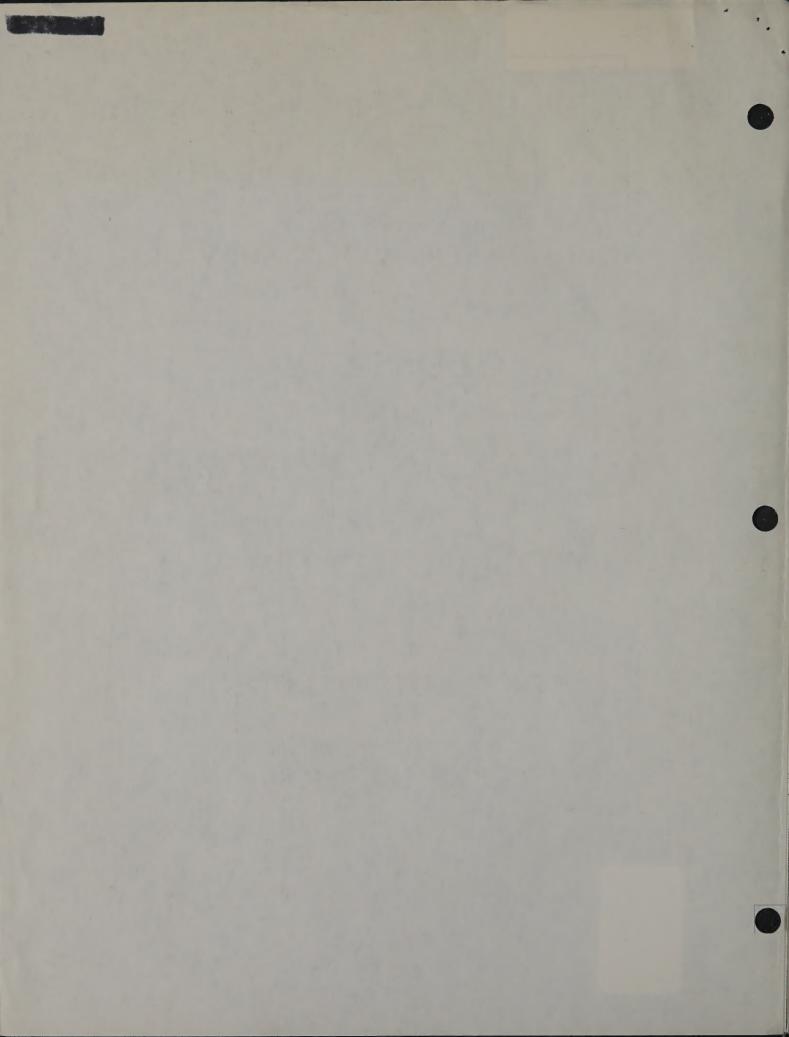


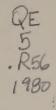
# **OSSA** WASHINGTON TANA H GEC HC ELEGTED AND WYOMING GEOLOGIC TERMS NEVADA UTAH COLORADO PORTLAND, OREGON CALIFORNIA SEPTEMBER 1980 °DC ARIZONA NEW MEXICO QE 5 .R56 1980



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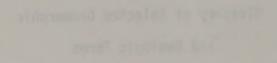


Glossary of Selected Geomorphic and Geologic Terms

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J. W. Hawley and R. B. Parsons West Technical Service Center Soil Conservation Service Portland, Oregon

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United States Department of Aoriculture Soil Conservation Service West Technical Service Center 511 N.W. Broadway, Rm. 510 Portland, Oregon 97209

Standardization of earth science terminology for soil series descriptions and manuscripts is important in clearly presenting the occurrence of soils. A number of such terms have been used incorrectly or without reasonable means of verification.

Soil Scientists in the West are encouraged to limit the terminology for soil science, geology, and geomorphology in soil series and map unit descriptions to those terms that appear in the Soil Science Society of America Glossary, in American Geological Institute Glossary, in a Webster's Dictionary, or in the enclosed "Glossary of Selected Geologic and Geomorphic Terms" developed by Drs. Hawley and Parsons. Any term not found in a standard reference should be defined in the manuscript glossary. The nonstandard term and its definition should be reviewed by the Head, Soils Staff before it is widely used.

Landform terminology should be consistent among the official series, series for the manuscript, mapping units, and general soil map descriptions and legend, and also in any discussion of the series in the genesis section or any other part of the manuscript.

CHARLES F. LEMON Director



The Soil Conservation Service is an agency of the Department of Agriculture

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### INTRODUCTION TO GLOSSARY OF SELECTED GEOLOGIC AND GEOMORPHIC TERMS

Attached is the glossary of selected geologic and geomorphic terms prepared for the Cooperative Soil Survey in the Western States. About 195 terms are defined.

In selecting terms for definition I reviewed pertinent items in recent soil survey manuscripts, the 1976 edition of the SCSA Resource Conservation Glossary, the SSSA Glossary of Soil Science Terms, and the American Geological Institute Glossary (see 1980 edition by Bates and Jackson). To this basic list were added terms that are commonly used in current geologic, physical geographic, and soil-geomorphic literature. Some of this terminology has been developed or refined during the course of the four major SCS Soil-Geomorphology Projects in Iowa, New Mexico, North Carolina, and Oregon.

Dr. Rog Parsons made many suggestions for additions, wording changes, deletions and provided a number of definitions for the first revision. We tested definitions at field training sessions for ongoing soil surveys throughout the West.

We regard this glossary as a state-of-the-art effort that certainly will be improved with further work. It is designed primarily for use during the course of a soil survey, especially as an aid in literature review and geologic map interpretation early in the survey. (See sections 302.3 and 302.6, Part II, National Soils Handbook).

There are three major categories of terms: (1) earth materials, (2) landforms, and (3) geomorphic processes. Definitions of geologic-geomorphic terms are commonly long and complex because abstract genetic as well as concrete physical and chemical attributes are usually involved. For example, asymmetricl ridges produced by differential erosion of gently dipping, resistant and weak strata are termed "cuestas." Identical topographic features comprising tilted fault blocks are not cuestas. As in the case of Soil Taxonomy, many definitions contain words with special meanings given elsewhere in the glossary. Thus, a considerable amount of cross referencing is required.

Finally, certain types of terminology are much too complex for clear presentation in a glossary. Works listed in the attached bibliography should be consulted for basic earth science information. General landform and geomorphic process information is well presented by Bloom (1978), Fairbridge (1968), Hunt (1974), Ritter (1978), Schumm (1977), and Thornbury (1965, 1969).

Special geomorphic processes and products are covered by Cooke and Warren (1973), Flint (1971) and Wyllie (1976). The best textbooks on soil-geomorphic relationships are by Birkeland (1974) and Ruhe (1975). Soil Survey Investigations Project Reports by Daniels, Gamble, Gile, Parsons, Ruhe, and associates are the best source of information on this subject. Techniques of field geology, including clear explanations of field classifications of igneous and metamorphic rocks, are presented by Compton (1962). Pettijohn (1975) should be consulted for up-to-date information on sedimentary and pyroclastic rocks. Recently published introductory geology texts by Compton (1977), Hamblin (1975), and Hamblin and Howard (1980) are highly recommended. Finally the 1975 American Geological Institute Data Sheet edition provides very useful summaries of geologic information (eg. rock classification and composition) that can be inserted in field notebooks. All books listed should be obtained for SCS State Office libraries, and within-state circulation. Asterisks denote books that are useful in field office libraries.

JOHN W. HAWLEY Socorro, New Mexico June 1980

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### ablation till

Loose permeable till deposited during the final downwasting of nearly static glacial ice. Lenses of crudely sorted sand and gravel are common. (cf. glacial till, moraine)

### active slope

A mountain or hill slope that is responding to valley incision, with erosion (either geologic or accelerated) exceeding <u>regolith</u> weathering, and that has <u>detritus</u> accumulated behind obstructions indicating contemporary transport of <u>slope</u> <u>alluvium</u>. Slope gradients usually exceed 45 percent. (cf. metastable slope)

### alluvial

Pertaining to material or processes associated with transportation or deposition by running water.

### alluvial cone

The material washed down mountain and <u>hill</u> slopes by <u>ephemeral</u> <u>streams</u> and deposited at the mouth of gorges in the form of a moderately steep conical mass descending equally in all directions from the point of issue.

### alluvial fan

A body of alluvium, with or without <u>debris flow</u> deposits, whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley onto a plain. Common longitudinal profiles are gently sloping and nearly linear. Source uplands range in relief and areal extent from <u>mountains</u> and <u>plateaus</u> to gullied terrains on <u>hill</u> and piedmont slopes.

### alluvial terrace

(cf. stream terrace)

### alluvium

Unconsolidated <u>clastic</u> material deposited by running water, including gravel, sand, silt, clay and various mixtures of these.

### anticline

A unit of folded strata that is convex upward. In a single anticline beds forming the opposing limbs of the fold dip away from its axial plane. (cf. syncline, monocline)



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arête

A narrow, jagged mountain crest, often above the snowline, sculptured by alpine glaciers and formed by backward erosion of adjoining cirque walls.

### arroyo

The flat-floored channel of an <u>ephemeral stream</u>, commonly with very steep to vertical banks cut in alluvium (regional term - Southwest; syn. <u>wash</u>). NOTE: Where arroyo reaches intersect zones of ground-water discharge they are more properly classed as intermittent stream channels.

ash (volcanic)

Fine pyroclastic material under 4.0 mm diameter.

## backslope (hillslope)

The geomorphic component that forms the steepest inclined surface and principal element of many <u>hillslopes</u> (e.g., <u>valley side</u>, ridge side). Backslopes in profile are commonly steep, linear, and may or may not include cliff segments, also called "gravity slopes" or "free faces." The term "mid-slope" may be used to designate an element without a cliff. In terms of gradational process, backslopes are erosional forms produced mainly by <u>mass wasting</u> and running water. NOTE: Structural geomorphologists may use the term as a synonym of <u>dipslope</u> in describing <u>homoclinal</u> ridges (e.g., <u>cuesta</u> "backslope"). (cf. footslope, shoulder)

### backswamp (flood-plain landform)

Extensive, marshy, depressed areas of <u>flood</u> <u>plains</u> between the <u>natural</u> <u>levee</u> borders of channel belts and <u>valley</u> <u>sides</u> or <u>terraces</u>. (cf. valley flat)

### bajada (bahada)

A broad, gently-inclined, <u>piedmont slope</u> formed by lateral coalescence of a series of <u>alluvial</u> fans, and having a broadly undulating transverse profile (parallel to the mountain front) due to the convexities of component fans. The term is generally restricted to constructional slopes of intermontane basins in the southwest U.S.A. (syn. coalescent fan piedmont)

### bar and channel

The microrelief common to flood plains and relatively young alluvial terraces. With time the microrelief becomes subdued as the higher lying bars erode into the channels. The ridge-like bars often consist of accumulations of coarse sediment, while the channels are finer textured. The relief between bar and channel is largely related to the competence of the stream. A narrow, paged counters crest, often above the snowline, sculptured by algine clucipre and farmed by backward erosion of adjoining circule walls.

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### basal till

Compact till, commonly clay rich, deposited beneath a moving glacier. Lodgement till is a variety characterized by dense fissile structure and stones oriented with long axes roughly parallel to direction of ice movement. (cf. glacial till)

### base level

The theoretical limit or lowest level toward which erosion of the earth's surface constantly progresses but seldom, if ever, reaches; especially the level below which a stream cannot erode its bed. The ultimate base level for the land surface is sea level, but temporary base levels may exist locally. The base level of eolian erosion may be above or below sea level; that of marine erosion is the lowest level to which marine agents can cut a bottom.

### basin (intermontane)

A broad structural lowland, commonly elongated and many miles across, between mountain ranges. Major component landforms are <u>basin floors</u> and <u>pied-mont slopes</u>. Floors of internally-drained basins (<u>bolsons</u>) contain one or more closed depressions, with temporary lakes (<u>playas</u>), and alluvial plains. In basins with through drainage, alluvial plains are dominant and lakes are absent or of small extent. Piedmont slopes comprise erosional surfaces (pediments) of individual and/or coalescent alluvial fans. (cf. valley)

basin floor

A general term for the nearly level to gently sloping, bottom surface of an intermontane <u>basin</u> (<u>bolson</u>). Component landforms include <u>playas</u>, broad <u>alluvial</u> flats containing <u>ephemeral</u> drainageways, and <u>relict alluvial</u> and <u>lacustrine</u> surfaces that rarely if ever are subject to flooding. Where through-drainage systems are well developed alluvial plains are dominant and lake plains are absent or of limited extent. Basin floors grade mountainward to distal parts of <u>piedmont slopes</u>.

### bedrock

The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface. (cf. regolith)

bench

(cf. structural bench)

bolson

An internally drained (closed), intermontane basin with two major land-form components: basin floor and piedmont slope. The former includes nearly level alluvial plains and playa-lake depressions. The latter comprises slopes

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### braided channel or stream (flood plain landforms)

A channel or stream with multiple channels that interweave as a result of repeated bifurcation and convergence of flow around interchannel bars, resembling in plan the strands of a complex braid. Braiding is generally confined to broad, shallow streams of low sinuosity, high bedload non-cohesive bank material, and steep gradient. At a given bank-full discharge braided streams have steeper slopes, and shallower, broader and less stable channel cross sections than meandering streams. (cf. flood plain landforms)

### breaks

The steep to very steep broken land at the border of an <u>upland</u> summit that is dissected by <u>ravines</u>.

### breccia

A coarse-grained <u>clastic</u> rock composed of angular rock fragments (larger than 2 mm), commonly cemented together in a finer-grained matrix of varying composition and origin. The consolidated equivalent of rubble. (cf. conglom-erate)

buried

Pertaining to landforms, geomorphic surfaces and paleosols covered by a mantle of geologic material (e.g., sedimentary or volcanic).

### butte

An isolated, usually flat-topped upland mass characterized by summit widths that are less than heights of bounding erosional scarps. An <u>upland</u> type produced by differential erosion of nearly horizontal, interbedded weak and resistant rocks, with the latter comprising caprock layers. As summit area increases relative to height, buttes are transitional to <u>mesas</u>. (cf. plateau, cuesta)

### caliche

A general term for a prominent zone of secondary carbonate accumulation in surficial materials of warm, subhumid to arid areas formed by both geologic and pedologic processes. Finely crystalline calcium carbonate forms a nearly continuous surface-coating and void-filling medium in geologic (parent) materials. Cementation ranges from weak in nonindurated forms to very strong in types that are indurated. Other minerals (carbonate, silicate, sulphate) may be present as accessory cements. of erotional origin adjoining the nountain fronts (mediments) and complex remetructional surfaces (bajadas) mainly composed of individual and/or combescent allovial fama. (regional term Southwest)

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A long, deep, narrow, very steep-sided valley with high and precipitous walls in an area of high local relief (e.g., mountain or high plateau terrain).

### catsteps

(cf. terracettes)

### cirque

Semicircular, concave, bowl-like areas with steep faces primarily resulting from glacial ice and snow abrasion.

### clast

An individual constituent, grain, or fragment of sediment or rock, produced by the mechanical weathering (disintegration) of a larger rock mass.

### clastic

Pertaining to a rock or sediment composed mainly of fragments derived from preexisting rocks or minerals and moved from their place of origin. (cf. detritus, epiclastic, pyroclastic)

coalesced fan piedmont

(cf. bajada)

### colluvial

Pertaining to material transported and deposited by <u>mass</u> <u>wasting</u> (direct gravitational action) and local unconcentrated runoff on and at the base of steep slopes.

### colluvium

Unconsolidated earth material deposited on and at the base of steep slopes by <u>mass</u> <u>wasting</u> (direct gravitational action) and local unconcentrated runoff.

### congeliturbate

Unconsolidated earth material moved or disturbed by frost action.

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### Spars

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### conglomerate

A coarse-grained, <u>clastic</u> rock composed of rounded to subangular rock fragments, (larger than 2 mm) commonly with a matrix of sand and finer material; cements include silica, calcium carbonate, and iron oxides. The consolidated equivalent of gravel. (cf. breccia)

### constructional (geomorph.)

Owing its origin, form, position or general character to depositional (aggradational) processes, such as accumulation of sediment to form an <u>alluvial</u> fan or terrace. (cf. erosional)

#### creep

Slow mass movement of earth material down relatively steep slopes, primarily under influence of gravity but facilitated by saturation with water and frost action.

### cuesta

An asymmetric, <u>homoclinal</u> ridge capped by resistant rock layers of slight to moderate dip (<10°, < 16%); produced by differential erosion of interbedded resistant and weak rocks. A long, gently sloping to sloping face (<u>dipslope</u>) roughly paralleling the inclined beds, opposes a relatively short and steep (scarp) face cut across the tilted rocks. (cf. hogback, mesa)

### debris

Any surficial accumulation of loose material detached from rock masses by chemical and mechanical means, as by decay and disintegration, and occurring in the place where it was formed, or transported by water or ice and redeposited. It consists of rock fragments, finer-grained earth material, and sometimes organic matter.

### debris flow (mudflow)

A mass movement process involving rapid flowage of highly viscous mixtures of <u>debris</u>, water, and entrapped air. Water content may range up to 60%. A mudflow is a type of debris flow with <u>clastic</u> particles of sand size and finer. (cf. alluvial fan)

### delta

A body of alluvium, whose surface form is nearly flat and fan-shaped, deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, usually a sea or lake.

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A courser-grained, clastic neck composed of rounded to subengular rock frequents, (farger thin 2 mm) coheonly with a matrix of sand and finer material; commune inclusio silica; calcium carbonate, and iron oxides. The consolidated requiratent of gravel. (cf. breacta)

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### desert pavement

A layer of gravel or coarser fragments on desert soil surfaces that (1) was emplaced by upward movement of fragments from underlying sediments, or (2) formed as a lag concentrate after finer particles have been removed by running water or wind (i.e., a variety of erosion pavement).

### detritus

Rock and mineral fragments occurring in sediments that were derived from pre-existing igneous, sedimentary, or metamorphic rocks.

### dipslope

A slope of the land surface, roughly determined by and approximately conforming with the dip of underlying bedded rocks; for example, the long, gently inclined surface of a cuesta. (syn. structural backslope; cf. scarp slope)

### draw

A small stream valley, generally more open and with broader bottom land than a <u>ravine</u> or <u>gulch</u>.

### drumlin

A low, smooth, elongated oval hill, mound, or ridge of compact glacial till that may or may not have a core of <u>bedrock</u> or stratified <u>glacial</u> <u>drift</u>. The longer axis is parallel to the general direction of glacier flow. Drumlins are products of streamline flow of glaciers which molded the subglacial floor through a combination of erosion and deposition.

#### dune

A mound, ridge, or hill of loose, windblown granular material (generally sand), either bare or covered with vegetation.

### dune (barchan)

A crescent-shaped <u>dune</u> with tips extending to the leeward, making this side concave in plan and the windward side convex. Barchan (parabolic) dunes tend to be arranged in chains extending in the direction of the most effective wind.

dune (parna)

A dune largely composed of sand-size aggregates of clay.

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### dune (seif)

A longitudinal <u>dune</u> about six times as wide as it is high and oriented parallel, rather than transverse, to the prevailing wind.

### eolian

Pertaining to material transported and deposited by the wind. Includes earth materials ranging from dune sands to silty loess deposits.

### ephemeral stream

A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is at all times above the water table. (cf. arroyo, intermittent stream)

### epiclastic

Pertaining to any <u>clastic</u> rock or sediment other than <u>pyroclastic</u>. Constituent fragments are derived by weathering and erosion rather than by direct volcanic processes. (cf. volcaniclastic)

### erosion

The wearing away of the land surface by running water, waves, moving ice and wind, or by such processes as mass wasting and corrosion (solution and other chemical processes). The term "geologic erosion" refers to natural processes occurring over long (geologic) time spans.

### erosional (geomorph.)

Owing its origin, form, position or general character to wearing-down (degradational) processes, such as removal of weathered rock debris by any mechanical or chemical processes to form, for example, a <u>pediment</u> or valley-side slope. (cf. constructional)

### erosion pavement

A concentration of gravel or coarser fragments that remains on the soil surface as a lag after finer particles have been removed by running water or wind. (cf. stone line, desert pavement)

### escarpment

A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and produced by erosion or faulting. The term is more often applied to cliffs produced by differential erosion and it is commonly used synonymously with "scarp."

#### dune (seif)

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### esker

A long, narrow, sinuous, steep-sided ridge composed of irregularly stratified sand and gravel that was deposited by a subsurface stream flowing between ice walls or in an ice tunnel of a retreating glacier, and was left behind when the ice melted. Eskers range in length from less than a kilometer to more than 160 km, and in height from 3 to 30 m. (cf. glaciofluvial deposits)

### exhumed

Pertaining to formerly <u>buried</u> <u>landforms</u>, <u>geomorphic</u> <u>surfaces</u> or <u>paleosols</u> that have been re-exposed at the ground surface by erosion of the covering mantle. (cf. relict)

### extrusive

Denoting igneous rocks derived from deep-seated molten matter (magmas) emplaced on the earth's surface. (cf. intrusive; volcanic)

### facies (stratigraphy)

The sum of all primary lithologic and paleontologic characteristics exhibited by a sedimentary rock and from which its origin and environment of formation may be inferred; the general nature or appearance of a sedimentary rock produced under a given set of conditions; a distinctive group of characteristics that distinguishes one group from another within a stratigraphic unit. (e.g., contrasting river-channel facies and overbank-flood-plain facies in alluvial valley fills)

### fan terrace

A relict <u>alluvial</u> fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces. An abandoned former fan surface.

### fault

A fracture or fracture zone of the earth with displacement along one side in respect to the other.

### flood plain

The nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

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### flood-plain landforms

A variety of constructional and erosional features produced by stream channel migration and flooding. (e.g., <u>backswamps</u>, <u>braided</u> <u>channels</u> <u>and</u> <u>streams</u>, <u>flood</u> <u>plain</u> <u>splays</u>, <u>meander</u>, <u>meander</u> <u>belt</u>, <u>meander</u> <u>scrolls</u>, <u>oxbow</u> <u>lakes</u>, <u>natural</u> <u>levees</u>, and valley flats.)

### flood-plain splay

(cf. meander belt)

### fluvial

Of or pertaining to rivers; produced by river action, as a fluvial plain.

### foothills

A steeply sloping upland with hill relief (up to 1000 ft, 300 m) that fringes a mountain range or high-plateau escarpment. (cf. hill, mountain, plateau)

### footslope

The geomorphic component that forms the inner gently inclined surface at the base of a <u>hillslope</u>. The surface profile is dominantly concave; and in terms of gradational processes, it is a transition zone between upslope sites of erosion (<u>backslope</u>) and downslope sites of deposition (<u>toeslope</u>). (cf. hillslope)

### formation (stratigraphy)

The basic rock-stratigraphic unit in the local classification of rocks. A body of rock (commonly a sedimentary stratum or strata, but also igneous and metamorphic rocks) generally characterized by some degree of internal lithologic homogeneity or distinctive lithologic features (such as chemical composition, structures, textures, or general kind of fossils), by a prevailing (but not necessarily tabular) shape, and by mappability at the earth's surface (at scales of the order of 1:25,000) or traceability in the subsurface.

### geomorphology

The science that treats the general configuration of the earth's surface; specifically the study of the classification, description, nature, origin, and development of landforms and their relationships to underlying structures, and of the history of geologic changes as recorded by these surface features.

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A veriety of constructional and erostonal reatures produced by scream efference signation and flooding. (e.g., backswamps, braided channels and sternams, flood plain splays, moorder, meander belt, meander scrolls, oxbow lanes, natural lavees, and valley flats, J

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### geomorphic surface

A geomorphic surface represents an episode of landscape development and consists of one or more <u>landforms</u> (Balster and Parsons). A mappable part of the land surface that is defined in terms of morphology (relief, slope, aspect, etc.), origin (erosional, constructional, etc.), age (absolute, relative), and stability of component landforms. (cf. buried, exhumed, relict)

### glacial drift

All rock material transported and deposited by glacial ice and meltwater; includes <u>glacial till</u>, <u>glaciofluvial</u> (outwash), and <u>glaciolacustrine</u> deposits from alpine, piedmont, or continental glaciers.

### glacial outwash

Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by water that originated mainly from the melting of glacial ice. Outwash deposits may occur in the form of valley fills (valley trains and/or outwash terraces) or as widespread <u>outwash plains</u>. (cf. glacial drift, glaciofluvial deposits)

### glaciofluvial deposits

Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and may occur in the form of <u>outwash plains</u>, <u>valley trains</u>, and <u>deltas</u>, <u>kames</u>, <u>eskers</u>, and kame terraces. (cf. glacial drift and glacial outwash)

### glaciolacustrine deposits

Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes by water originating mainly from the melting of glacial ice. Many are bedded or laminated with varves.

### glacial till

Unsorted and unstratified glacial drift, generally unconsolidated, deposited directly by a glacier without subsequent reworking by water from the glacier, and consisting of a heterogeneous mixture of clay, sand, gravel, and boulders varying widely in size and shape. (cf. ablation till, basal till)

#### gulch

A small stream valley, narrow and steepsided in cross section, and larger than a gully. (Regional term - western U.S.A.; general syn. ravine; cf. draw)

#### commorphic surface

A generative surface represents an episode of landscape do - opent and constate of one an even landforms (Baister and Parsons). A mappable part of the land surface that is unfined in terms of morphology (relief, slope, aspect, etc.). origin (erostonal, constructional, etc.), oge (absolute, relative); and stability of concernent landforms, (cf. burled, exhumed, relict)

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### gully

A very small valley with steep sides cut by running water and through which water ordinarily runs only after a rain or ice or snow melt. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to wheeled vehicles and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage. (cf. gulch, arroyo, wash, draw)

### hill

A natural elevation of the land surface, rising as much as 1,000 ft (300 m) above surrounding lowlands, usually of restricted summit area (relative to a tableland) and having a well-defined outline; hill slopes generally exceed 15%. The distinction between a hill and a <u>mountain</u> is often dependent on local usage. (cf. foothills)

### hillslope

The steeper part of a hill between its <u>summit</u> and the drainage line, valley flat or depression floor at the base of the hill. In descending order geomorphic components of a simple hillslope may include <u>shoulder</u>, <u>backslope</u>, <u>footslope</u> and <u>toeslope</u>. However, all of these components are not necessarily present in any given hillslope continuum. In addition, complex hillslopes may include two or more backslope to toeslope sequences.

### hogback

A sharp-crested, symmetric (<u>homoclinal</u>) ridge formed by highly tilted resistant rock layers; produced by differential erosion of interlayered resistant and weak rocks with dips greater than about 25° (45%). (cf. cuesta)

#### Holocene

The second epoch of the <u>Quaternary</u> Period of geologic time, extending from the end of the <u>Pleistocene</u> Epoch (about 10 to 12 thousand years ago) to the present; also the corresponding (time-stratigraphic) "series" of earth materials. (syn. post-glacial, Recent)

### homoclinal (structural geomorph.)

Pertaining to strata that dip in one direction with a uniform angle. (cf. cuesta, hogback)

### igneous rock

Rock formed by solidification from a molten or partially molten state; major varieties include <u>plutonic</u> and <u>volcanic</u> rocks. (cf. intrusive, extrusive; Examples: andesite, basalt, granite)

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### intermittent stream

A stream, or reach of a stream, that flows for protracted periods only when it receives ground-water discharge or long-continued contributions from melting snow or other surface and shallow subsurface sources. (cf. ephemeral stream)

### intrusive

Denoting igneous rocks derived from molten matter (magmas) which invaded pre-existing rocks and cooled below the surface of the earth. (cf. extrusive)

### joint (geology)

A surface of actual or potential fracture or parting in a rock, without displacement; the surface is usually plane and often occurs with parallel joints to form part of a joint set.

### kame

A moundlike hill of ice-contact <u>glacial</u> <u>drift</u>, composed chiefly of stratified sand and gravel.

#### kame terrace

A <u>terrace</u>-like ridge consisting of stratified sand and gravel (1) deposited by a meltwater stream flowing between a melting glacier and a higher valley wall or lateral moraine, and (2) left standing after the disappearance of the ice. It is commonly pitted with "<u>kettles</u>" and has an irregular ice-contact slope.

### karst

A type of topography that is characterized by closed depressions or <u>sink</u> <u>holes</u>, and is dependent upon underground solution and the diversion of surface waters to underground routes. It is formed over limestone, dolomite, gypsum and other soluble rocks as a result of differential solution of these materials and associated processes of subsurface drainage, cave formation, subsidence, and collapse.

### kettle.

A steep-sided, bowl-shaped depression without surface drainage in glacial drift deposits and believed to have formed by the melting of a large, detached block of stagnant ice buried in the glacial drift.

### knickpoint

Any interruption or break in slope; a point of abrupt inflection in the longitudinal profile of a stream or of its valley.

#### mastic institutui

A stream, or reach of a stream, that flows for protracted periods only wann it receives ground-water discharge or long-continued contributions from weiting snow or other surface and shallow subsurface sources. (cf. ephemeral stream)

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knoll

A small, low, rounded <u>hill</u> rising above adjacent <u>landforms</u>. (syn. hillock, knob)

### lacustrine deposit

<u>Clastic</u> sediments and chemical precipitates originally deposited in lakes.

### lahar

A mudflow composed chiefly of volcaniclastic materials on the flank of a volcano. The debris carried in the flow includes pyroclastic material, blocks from primary lava flows, and epiclastic material.

### lamination (lamina)

A sedimentary layer less than 1 centimeter thick.

### landform

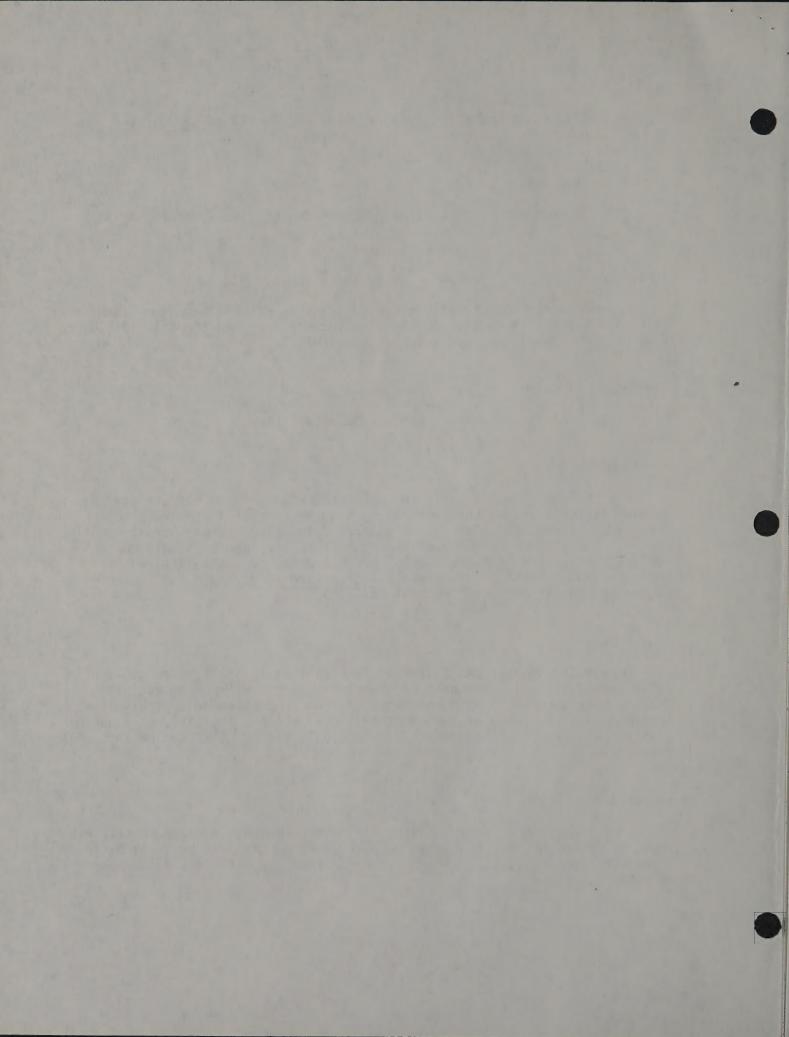
Any physical, recognizable form or feature of the earth's surface, having a characteristic shape, and produced by natural causes; it includes major forms such as a <u>plain</u>, <u>plateau</u>, or <u>mountain</u>, and minor forms such as a <u>hill</u>, <u>valley</u>, slope, <u>esker</u>, or <u>dune</u>. Taken together, the landforms make up the surface configuration of the earth. The "landform" concept involves both empirical description of a terrain (<u>land-surface form</u>) class and interpretation of genetic factors ("natural causes").

### landscape

(Gen.) All the natural features, such as fields, hills, forests, and water that distinguish one part of the earth's surface from another part; usually that portion of land which the eye can comprehend in a single view, including all of its natural characteristics. (Geol.) The distinct association of landforms, esp. as modified by geologic forces, that can be seen in a single view.

#### landslide

A mass-wasting process, and the landform produced, involving moderately rapid to rapid (greater than one foot per year) downslope transport, by means of gravitational stresses, of a mass of rock and regolith that may or may not be water saturated.



# land-surface form

The description of a given terrain unit based on empirical analysis of the land surface rather than interpretation of genetic factors. Surface form may be expressed quantitatively in terms of vertical and planimetric slopeclass distribution, local and absolute relief, and patterns of terrain features such as interfluve crests, drainage lines, or escarpments.

### limestone

A <u>sedimentary rock</u> consisting chiefly (more than 50%) of calcium carbonate, primarily in the form of calcite. Limestones are usually formed by a combination of organic and inorganic processes and include chemical and <u>clastic</u> (soluble and insoluble) constituents; many are fossiliferous.

# lithification

The conversion of a newly deposited, unconsolidated sediment into a coherent and solid rock, involving processes such as cementation, compaction; desiccation, crystallization, recrystallization, and compression. It may occur concurrent with, or shortly or long after deposition.

# lithologic

Pertaining to the physical character of a rock.

# loess

Fine-grained wind-deposited material, dominantly of silt-size.

### marl

An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions (35-65% of each); formed primarily under freshwater <u>lacustrine</u> conditions, but varieties associated with more saline environments also occur.

### mass wasting (mass movement)

Dislodgement and downslope transport of earth (regolith and rock) material as a unit under direct gravitational stress. The process includes slow displacements such as creep, and solifluction, and rapid movements such as landslides, rock slides and falls, earthflows, debris flows, and avalanches. Agents of fluid transport (water, ice, air) may play a subordinate role in the process.

# meander, meandering channel (flood-plain landforms)

A meander is one of a series of sinuous loops, with sine-wave form, in the course of a stream channel. The term "meandering" should be restricted to

### WART SOUTHERNESS

The description of a given terrain unit based on empirical analysis of any is accussed quantitatively in terms of vertical and planimatric sloperises of vertical and absolute vallet, and planimatric slopefearmers such as interflows crosss, drainage lines, or escarpoints.

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loops with channel length more than 1.5 to 2 times the length of the wave form. Meandering stream channels commonly have cross sections with low width to depth ratios, (fine-grained) cohesive bank materials, and low gradient. At a given bank-full discharge meandering streams have gentler slopes, and deeper, narrower and more stable channel cross-sections than <u>braided streams</u>. (cf. flood-plain landforms)

# meander belt (flood-plain landforms)

The bottomland zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangentially to the outer bends of active channel loops. Landform components of the meander-belt surface are produced by a combination of gradual (lateral and down-valley) migration of meander loops and evulsive channel shifts causing abrupt cut-offs of loop segments. Forms flanking the sinuous stream channel include: point bars made up of one or more low, arcuate bar ridges and intervening swales that form by accretion of bed and suspended load on the convex banks of loops; and scars of abandoned meanders and flanking point bars. Sandy to gravelly bed load materials form the bulk of point bar deposits, and individual ridge-swale pairs are termed meander scrolls. Oxbow lakes are flooded segments of abandoned meander loops within which fine-grained suspendedload material accumulates over coarser channel deposits. During flood stages when a stream overtops its banks and spreads out over adjacent flood-plain areas, flow velocities are reduced and coarser fractions of the sediment load are commonly deposited close to the channel. Natural levees are wedge-shaped deposits of coarsest suspended-load material that form long, low ridges on channel banks and slope gently away from the stream. Flood-plain splays are small alluvial fans formed where the flooding stream breaks through a levee (natural or artificial) and deposits the coarser part of its load on the adjacent flood plain (e.g., backswamp or valley-flat surfaces). Many meander belts do not exhibit prominent natural levee or splay forms. Flood plains of broad alluvial valleys may contain one or more abandoned meander belts in addition to the zone flanking the active stream channel.

meander scroll

(cf. meander belt)

mesa

A broad, nearly flat-topped and usually isolated upland mass characterized by summit widths that are greater than the heights of bounding erosional escarpments. A tableland produced by differential erosion of nearly horizontal, interbedded weak and resistant rocks, with the latter comprising caprock layers. As summit area decreases relative to height mesas are transitional to <u>buttes</u>. In the western states <u>mesa</u> is also commonly used to designate broad <u>structural benches</u> and alluvial <u>terraces</u> that occupy intermediate levels in stepped sequences of <u>platforms</u> bordering canyons and valleys. (cf. plateau, cuesta) form: Houndering strene channels commonly have cross sections with low width to company the destrene channels commonly have cross sections with low width to depth ratios, (fine-grained) cohesive bank materials, and low gradient. At a present bank-full discharge meandering streams have gentler, singes, and deeper, narrows and corp stable channel cross-sections than brained streams. (cf. ried-plain Tandierma)

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# metamorphic rock

Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth's crust. Nearly all such rocks are crystalline. (Example: schist, gneiss, quartzite)

# metastable slope

A slope that is relatively stable at the present time, but may become active if the environmental balance is disturbed, for instance, by road construction or destruction of vegetation. A metastable slope is often related to base levels of former geomorphic episodes. The regolith is generally moderately deep, may contain stone lines, or relict evidence of slope alluvium. Slope gradients usually range from 15 to 45 percent. (cf. active slope)

### monocline

A unit of folded strata that flexes from the horizontal in one direction only, and is not part of an <u>anticline</u> or <u>syncline</u>. This structure is typically present in plateau areas where nearly flat strata locally assume steep dips to differential vertical movements without faulting.

### moraine (general)

An accumulation of drift, with an initial topographic expression of its own, built chiefly by the direct action of glacial ice. Examples are end, ground, lateral, recessional, and terminal moraines. (cf. glacial till)

### moraine (end)

A moraine produced at the front of an actively flowing glacier at any given time. (cf. terminal and recessional moraines)

# moraine (ground)

An extensive, fairly even and thin layer of till, having an undulating surface; a deposit of rock debris dragged along, in, on and beneath a glacier and emplaced by processes including basal lodgement and release from downwasting stagnant ice (by ablation).

# moraine (lateral)

A ridge-like moraine carried on and deposited at the side margin of a valley glacier. It is composed chiefly of rock fragments derived from valley walls by glacial abrasion and plucking, or mass-wasting.

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An <u>end moraine</u>, built during a temporary but significant halt in the final retreat of a glacier.

moraine (terminal)

An <u>end moraine</u> that marks the farthest advance of a glacier and usually has the form of a massive arcuate ridge, or complex of ridges, underlain by till and other drift types.

# mountain

A natural elevation of the land surface, rising more than 1,000 ft (300 m) above surrounding lowlands, usually of restricted summit area (relative to a <u>plateau</u>), and generally having steep sides (>25% slope) and considerable bare-rock surface. A mountain can occur as a single, isolated mass, or in a group forming a chain or range. Mountains are primarily formed by deep seated earth movements and/or volcanic action and secondarily by differential erosion. (cf. hill)

### mudstone

Sedimentary rock formed by induration of silt and clay in approximately equal proportions.

natural levee

(cf. meander belt)

outwash plain

An extensive lowland area forming the surface of a body of coarse textured, <u>glaciofluvial</u> material. An outwash plain is commonly smooth; where pitted, due to melt-out of incorporated ice masses, it is generally low in relief. (cf. glacial outwash, kettles)

oxbow

(cf. meander belt)

# paleosol

A soil that formed on a <u>landscape</u> of the past (Ruhe) with distinctive morphological features resulting from a soil-forming environment that no longer exists at the site. The former pedogenic process was either altered because of external environmental change or interrupted by burial. A paleosol (or component horizon) may be classed as <u>relict</u> if it has persisted in a land-surface position without major alteration of morphology by processes of

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# patterned ground

A term for the more or less symmetrical forms such as circles, polygons, nets, stripes, garlands, and steps that are characteristic of, but not confined to, mantles subjected to intense frost action as in <u>periglacial</u> environments. Stone polygons generally form on slopes of less than 8 percent, while garlands and stripes occur on slopes of 8-15 percent and more than 15 percent, respectively (Parsons, 1976).

### peak

Sharp or rugged upward extension of a ridge chain, usually at the junction of two or more ridges; the prominent highest point of a summit area.

# pediment

A gently sloping <u>erosional</u> surface developed at the foot of a receding <u>hill or mountain slope</u>. The surface may be essentially bare, exposing earth material that extends beneath adjacent uplands; or it may be thinly mantled with <u>alluvium</u> and <u>colluvium</u>, ultimately in transit from upland front to basin or valley lowland. (In hill-footslope terrain the mantle is designated "pedisediment" by Ruhé). The term has been used in several geomorphic contexts: Pediments may be classed with respect to (1) landscape position, for example intermontane-basin <u>piedmont</u> or valley-border footslope surfaces (respectively, apron and terrace pediments of Cooke and Warren), (2) type of material eroded, bedrock or regolith, or (3) combinations of the above.

# periglacial

Pertaining to processes, conditions, areas, climates, and topographic features occurring at the immediate margins of former and existing glaciers and ice sheets, and influenced by cold temperature of the ice. The term was originally introduced to designate the climate and related geologic features peripheral to ice sheets of the Pleistocene. It has been loosely defined to include frost-action effects and <u>loess</u> deposits that may or may not be related to glaciers.

# piedmont slope

The dominant gentle slope at the foot of a mountain; generally used in terms of intermontane-basin terrain in arid to subhumid regions. Main components include: (1) an erosional surface on bedrock adjacent to the receding mountain front (pediment); (2) a constructional surface comprising individual <u>alluvial fans and interfan valleys</u>, also near the mountain front; and (3) a distal complex of coalescent fans (bajada), and alluvial slopes without fan form. Piedmont slopes grade to either basin-floor depressions with alluvial and temporary lake plains or surfaces of through drainage. (cf. bolson) and harden in the been re-excosed by prosion of the covering mantie. Most parenty marking mantie. Most margarity may be any profile truncation.

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# plain

An extensive lowland area that ranges from level to gently sloping or undulating. A plain has few or no prominent hills or valleys, and occurs at low elevation with reference to surrounding areas (local relief generally less than 100 m. (cf. plateau).

# plateau

An extensive upland mass with relatively flat <u>summit</u> area that is considerably elevated (more than 100 m) above adjacent lowlands, and is separated from them on one or more sides by escarpments. A comparatively large part of a plateau surface is near summit level. (cf. mesa, plain)

# playa

The usually dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those occurring on intermontane <u>basin</u> floors. Temporary flooding occurs primarily in response to precipitation-runoff events. Playa deposits are fine grained and may or may not be characterized high water table and saline conditions.

### Pleistocene

The first epoch of the <u>Quaternary</u> Period of geologic time, following the <u>Tertiary Pliocene</u> Epoch and preceding the <u>Holocene</u> (approx. from 2 million to 10 thousand years ago); also the corresponding (time-stratigraphic) "series" of earth materials. Glacial-interglacial stage/age subdivisions in North America include, in order of increasing age, Wisconsinan-Sangamonian, Illinoian-Yarmouthian, Kansan-Aftonian, and Nebraskan. (syn. Glacial epoch, Ice Age)

# Pliocene

The last epoch of the <u>Tertiary</u> Period of geologic time, following the Miocene Epoch and preceding the (<u>Quaternary</u>) <u>Pleistocene</u> Epoch (approx. 7 to 2 million years ago); also, the corresponding (time-stratigraphic) "series" of earth materials.

### plutonic

Pertaining primarily to <u>igneous</u> rocks formed deep in the earth's crust, but also including associated metamorphic rocks.

# pluvial lake

A lake formed in a period of exceptionally heavy rainfall; a lake formed in the <u>Pleistocene</u> epoch during a time of glacial advance, and now either extinct or existing as a remnant. (Example: Lake Bonneville, cf. periglacial) An excensive leviend area that ranges from level to gently sloping or unoulating. A mish has few or no prominent hills or vaileys, and occurs at few elevation with reference to surrounding areas (local relief generally less than 100 m. (ct. plateau).

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# pyroclastic

Pertaining to fragmental materials produced by usually explosive, aerial ejection of <u>clastic</u> particles from a <u>volcanic</u> vent. Such materials may accumulate on land or under water. (cf. epiclastic, volcaniclastic)

### Quaternary

The second period of the Cenozoic Era of geologic time, extending from the end of the Tertiary Period (about 2 million years ago) to the present and comprising two epochs, the <u>Pleistocene</u> (Ice Age) and the <u>Holocene</u> (Recent); also, the corresponding (time-stratigraphic) "system" of earth materials.

### ravine

A small stream valley; narrow, steep-sided, and commonly V-shaped in cross section; and larger than a gully. (general syn. gulch; cf. draw)

### regolith

All unconsolidated earth materials above the solid <u>bedrock</u>. It includes material weathered in place from all kinds of bedrock, and alluvial, glacial, eolian, lacustrine and pyroclastic deposits. Soil scientists regard soil as only that part of the regolith that is modified by organisms and other soil-forming forces. Most engineers describe the whole regolith, even to a great depth, as "soil." (cf. residuum)

### relict

Pertaining to surface landscape features (e.g., <u>landforms</u>, <u>geomorphic</u> <u>surfaces</u>, <u>paleosols</u>) that have never been <u>buried</u> and are products of past environments no longer operative in a given area. (cf. exhumed)

# relief

The elevations or inequalities of a land surface, considered collectively.

# residuum (residual soil material)

Unconsolidated, weathered, or partly weathered mineral material that only accumulates by disintegration of bedrock in place. (cf. saprolite, regolith)

### ridge

A long, narrow elevation of the land surface, usually sharp crested with steep sides and forming an extended upland between valleys. The term is used in areas of both hill and mountain relief (less and greater than 300 m).

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### saddle

A low point on a <u>ridge</u> or crestline, generally a divide (pass, col) between the heads of streams flowing in opposite directions.

### sandstone

Sedimentary rock containing dominantly sand-size clastic particles.

# saprolite

Soft, clay-rich, thoroughly decomposed rock formed in place by chemical weathering of igneous and metamorphic rock. In soil science, the term saprolite is applied to any unconsolidated residual material underlying the soil and grading to hard bedrock below. (cf. residuum)

# scoria

Vesicular, cindery, crust on the surface of andesitic or basaltic lava, the vesicular nature of which is due to the escape of volcanic gases before solidification; it is usually heavier, darker, and more crystalline than pumice. (syn. cinder)

#### scree

A heap of rock waste at the base of a cliff or a sheet of coarse debris mantling a slope. Scree is not a synonym of <u>talus</u>, as scree also includes loose material on slopes without cliffs.

### sediment

Solid <u>clastic</u> material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by water, wind, ice or <u>mass-wasting</u> and has come to rest on the earth's surface either above or below sea level. Sedimentary deposits in a broad sense also include materials precipitated from solution or emplaced by explosive volcanism, as well as organic remains (e.g., peat) that have not been subject to appreciable transport.

# sedimentary rock

A consolidated deposit of <u>clastic</u> particles, chemical precipitates and organic remains accumulated at or near the surface of the earth under "normal" low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of <u>alluvium</u>, <u>colluvium</u>, <u>glacial drift</u>, and <u>eolian</u>, <u>lacustrine</u> and marine deposits (e.g., <u>sandstone</u>, siltstone, <u>mudstone</u>, claystone, and <u>shale</u>, <u>conglomerate</u> and <u>limestone</u>, dolomite, coal, etc.; cf. sediment).

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<u>Sedimentary</u> <u>rock</u> formed by induration of a clay or silty clay deposit and having the tendency to split into thin layers (i.e., fissility)

# shoulder (hillslope)

The geomorphic component that forms the uppermost inclined surface at the top of a <u>hillslope</u>. It comprises the transition zone from <u>backslope</u> to <u>summit</u> of an upland. The surface is dominantly convex in profile and erosional in origin.

# sinkhole

A closed depression formed either by solution of the surficial bedrock (e.g., limestone, gypsum, salt) or by collapse of underlying caves. Complexes of sinkholes in carbonate-rock terranes are the main components of <u>karst</u> topography. (syn. doline)

# slope alluvium

Sediment gradually transported on <u>mountain</u> or <u>hill</u> slopes primarily by alluvial processes and characterized by particle sorting. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of coarse fragments and may be separated by <u>stone lines</u>. Sorting of rounded or subrounded pebbles or cobbles, and burned peds contrast with unsorted colluvial deposits.

### slump

The downward slipping of a mass of rock or unconsolidated material of any size, moving as a unit or as several subsidiary units, usually with backward rotation on a more or less horizontal axis parallel to the cliff or slope from which it descends.

# solifluction

Slow viscous downslope flow of water saturated <u>regolith</u>; especially the <u>mass-wasting</u> process occurring in areas of frozen ground, with alternate freezing and thawing of surficial materials.

# spur

A secondary divide between minor drainage systems of an area, that generally has an inverted "V" shape, and occurs considerably below the elevation of the associated ridge. Sedimentary rock formed by induration of a clay or stilly clay deposit and having the tendency to smilt into thin layers (i.e., fissility).

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A classed depression formed either by solution of the surficial bedrock (e.g., Hoesione, gypsum, sait) or by collapse of underlying caves. Complexes of sinvholes in carronate-rock terranes are the main components of <u>tarst</u> topography. (syn. dolfne)

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And internet gradually meneparted on mountain or hill slopes primarily by appoints processes and characterized by particle surting. In a profile the araw to at course fragments and may be expanded by stone lines. Sorting of request of subrantized regiments or cobbies, and burned peds contrast with becaring tell or with departs.

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The demound slipping of a mass of ruck or unconsolidated material of any size, marring as a unit or as several adistately units, usually with backward rotation on a wore or less norizontal axis peralisi to the cliff or slope from writer it descende.

#### 10130127600

Sine wheceas downships flow of water saturated regalitie; especially the mean-weekling process occurring to areas of frozen ground, with alternate frequences and thereing of surficial astarials.

#### 1000

A normality has an involved between viscor drafnage systems of an area, that aroundly has an involved "V" of the and occurs considerably below the slevacian of the associated ridge.

# steptoe

An island-like area in a lava flow.

### stone line

A sheet-like concentration of coarse fragments in surficial sediments. In cross-section, the line may be marked only by scattered fragments or it may be a discrete layer of fragments. The fragments are more often pebbles or cobbles than stones. A stone line generally overlies material that was subjected to weathering, soil formation, and erosion before deposition of the overlying material. Many stone lines seem to be buried <u>erosion pavements</u>, originally "formed by running water on the land surface and concurrently covered by surficial sediment" (Ruhe).

### strath terrace

(cf. stream terrace)

# stratified

Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

### stratigraphy

The branch of geology that deals with the definition and interpretation of stratified earth materials; the conditions of their formation; their character, arrangement, sequence, age, and distribution; and especially their correlation by the use of fossils and other means. The term is applied both to the sum of the characteristics listed and a study of these characteristics.

### stream order

In a drainage basin network, the smallest unbranched tributaries are designated order 1; the confluence of two first-order streams produces a stream segment of order 2; the junction of two second-order streams produces a stream segment of order 3; etc. The order of the drainage basin is determined by the highest integer.

### stream terrace

One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream, and representing the dissected remnants of an abandoned <u>flood plain</u>, stream bed, or <u>valley floor</u> produced during a former stage of erosion or deposition. Erosional surfaces cut on <u>bedrock</u> and thinly mantled with stream deposits (alluvium) are designated "<u>strath terraces</u>." Remnants of constructional valley floors are termed "alluvial terraces." (cf. terrace)

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### (cr. stream terrace)

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# structural bench (or bench)

A platform-type, nearly level to gently inclined erosional surface developed on resistant strata in areas where valleys are cut in alternating strong and weak layers with an essentially horizontal attitude. Structural benches, in contrast to stream terraces, have no geomorphic implication of former, partial erosion cycles and base-level controls, nor do they represent a stage of flood-plain development following an episode of valley trenching.

# summit

A general term for the top, or highest level of an upland feature such as a hill, mountain, or tableland. It usually refers to a high interfluve area of lower slope that is flanked by steeper sideslopes (e.g., <u>hillslopes</u>, mountain fronts, or <u>tableland escarpments</u>). Summit areas may or may not include distinct crest lines or high points that rise above their general level.

# swell-and-shale topography

Topography of ground moraine having low relief, gentle slopes, and well rounded hills interspersed with shallow depressions.

### syncline

A unit of folded strata that is concave upward. In a simple syncline, beds forming the opposing limbs of the fold dip toward its axial plane. (cf. anticline, monocline)

# tableland

A general term for a broad upland mass with nearly level or undulating summit area of large extent and steep sideslopes descending to surrounding lowlands. Varieties include plateaus, and mesas.

# talus

Rock fragments of any size or shape (usually coarse and angular) derived from and lying at the base of a cliff or very steep, rock slope. The accumulated mass of such loose broken rock formed chiefly by falling, rolling, or sliding. (cf. colluvium, mass wasting, scree)

### tephra

A collective term for all <u>clastic</u> <u>volcanic</u> materials which are ejected from a vent during an eruption and transported through the air, including volcanic <u>ash</u>, cinders, lapilli, <u>scoria</u>, pumice, bombs, and blocks. (syn. volcanic <u>ejecta</u>)

### (drast barah banah (or beach)

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#### art land

A sufficiency term for all classic volcanic anterfale which are elected from a rest conting an erantion and transported through the air, including volcanic and there, i wittit, scaria, puntee, boobs, and blocks. (sym.

# terrace (geomorphic)

A step-like surface, bordering a valley floor or shoreline, that represents the former position of an alluvial plain, or lake or sea shore. The term is usually applied to both the relatively flat summit surface (platform, tread), cut or built by stream or wave action, and the steeper descending slope (scarp, riser), graded to a lower <u>base level</u> of erosion. (cf. stream terrace)

### terracettes

Small, irregular step-like forms on steep hillslopes, especially in pasture, formed by creep of surficial materials that may or may not be induced by trampling of livestock such as sheep or cattle. (syn. catsteps, sheep or cattle tracks, soil ripples)

# Tertiary

The first period of the Cenozoic Era of geologic time, following the Mesozoic Era preceding the <u>Quaternary</u> (approx. from 65 to 2 million years ago); also the corresponding time-stratigraphic subdivision (system) of earth materials. Epoch/series subdivisions comprise, in order of increasing age, <u>Pliocene</u>, Miocene, Oligocene, Eocene, and Paleocene.

### till plain

An extensive flat to undulating area underlain by glacial till. (cf. glacial till, moraine-ground)

# toeslope

The geomorphic component that forms the outermost, gently-inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear; and in terms of gradational processes, they are constructional surfaces forming the distal part of a <u>hillslope</u> continuum that grades to valley or closed-depression floors. (cf. footslope, valley floor)

### topography

The relative positions and elevations of the natural or manmade features of an area that describe the configuration of its surface.

# upland (geomorphology)

Land at a higher elevation, in general, than the alluvial plain or low stream terrace; land above the footslope zone of the hillslope continuum.

### (androsep) souves?

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#### (vnointernation) basicu

Land at a higher elevation, in general, than the alluvial plath of low

An elongate, relatively large, externally-drained depression of the earth's surface that is primarily developed by stream erosion. (cf. basin-intermontane)

# valley-border surfaces

A general grouping of <u>valley-side</u> <u>geomorphic</u> <u>surfaces</u> that occur in a stepped sequence graded to successively lower stream base levels produced by episodic valley entrenchment.

# valley fill

The unconsolidated sediment deposited by any agent (water, wind, ice, mass wasting) so as to fill or partly fill a valley.

# valley flat (flood-plain landform)

A general term for broad, nearly level flood-plain surfaces that are not subject to frequent inundation. (cf. backswamp, meander belt)

### valley floor

A general term for the nearly level to gently sloping, bottom surface of a <u>valley</u>. Component landforms include axial stream channels, the <u>flood-plain</u>, and in some areas, low <u>terrace</u> surfaces that may be subject to flooding from tributary streams. (cf. flood-plain landforms, meander, braided channel, valley side)

# valley side (valley wall)

The sloping to very steep surfaces between the valley floor and summits of adjacent uplands. Well-defined, steep valley sides may be termed "valley walls." NOTE: Scale, relief, and perspective may require use of closely related terms such as hillslope, mountain slope, and ridge side.

### valley side alluvium

A concave "slopewash" deposit at the base of a hillslope, mountain slope, terrace escarpment, etc. that may or may not include the alluvial <u>toeslope</u> of a <u>pediment</u>.

### valley train

A long narrow body of <u>glacial</u> <u>outwash</u> confined within a valley below a glacier; it may, or may not, emerge from the valley and join an <u>outwash</u> plain.

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### valley-border surface

A general grouping of valley-side geomorphic surfaces that occur in a strong equance graded to successively lower stream base levels produced by optendic valley entremchant.

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### REATS WATERS

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varve

A sedimentary layer, <u>lamina</u> or sequence of laminae, deposited in a body of still water within 1 year; specifically, a thin pair of graded <u>glaciolacustrine</u> layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

### volcanic

Pertaining to (1) the deep-seated (<u>igneous</u>) processes by which magma and associated gases rise through the crust and are extruded onto the earth's surface and into the atmosphere, and (2) the structures, rocks, and landforms produced. (cf. extrusive)

### volcaniclastic

Pertaining to the entire spectrum of fragmental materials with a preponderance of clasts of volcanic origin. The term refers not only to <u>pyroclastic</u> materials but also to <u>epiclastic</u> deposits derived from volcanic source areas by normal processes of <u>mass</u> wasting and stream <u>erosion</u>. (Examples: welded tuff, volcanic breccia)

wash (dry wash)

The broad, flat-floored channel of an <u>ephemeral</u> <u>stream</u>, commonly with very steep to vertical banks cut in <u>alluvium</u>. NOTE: When channel reaches intersect zones of ground-water discharge they are more properly classed as "intermittent stream" channels. (Regional term - west U.S.A.; syn. arroyo)

# weathering

All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents with essentially no transport of the altered material. These changes result in disintegration and decomposition of the material. (cf. regolith, residuum, saprolite)

### wind gap

A former water gap now abandoned by the stream that formed it, suggesting stream piracy or stream diversion.

A sedimentary layer, lamina or sequence of laminae, deposited in a body of still water within I year; specifically, a thin pair of graded glaciolocustring layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

### '>insolov

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